FACTS ABOUT

Emissions and Health Benefits of Regulation for In-Use On-Road Diesel Vehicles

Reducing the health effects of air pollution from heavy duty trucks

On December 11, 2008, the California Air Resources Board (ARB) is considering the in-use on-road diesel vehicle regulation (regulation) to significantly reduce emissions from the nearly 1 million existing trucks and buses operated in on California's roads each year. This fact sheet discusses the estimated emissions benefits and associated health benefits of the proposed regulation. For a fact sheet with general information regarding the proposed regulation, please see: Overview of the Regulation to Reduce Emissions from In-Use On-Road Diesel Vehicles.

What are the expected emission benefits of the regulation?

In 1998, the ARB identified diesel particulate matter, commonly referred to as PM, as a toxic air contaminant. In 2000, the ARB approved a comprehensive plan, the Diesel Risk Reduction Plan or Diesel RRP, to reduce public's risk exposure to diesel PM by 80 percent by 2020 from 2000 levels. The proposed regulation will significantly reduce diesel PM emissions from trucks, providing an 80 percent reduction in 2020 from 2000 levels. While this falls somewhat short of the 2020 goal of reducing diesel PM by 85 percent from 2000 baseline levels, it represents the maximum achievable reductions of diesel PM emissions from existing trucks and buses.

The regulation will also provide significant near-term and long-term reductions in oxides of nitrogen (NOx) emissions from trucks and buses, which contributes to elevated smog levels throughout the state. The projected NOx emissions reductions from the regulation are 124 tons per day (tpd) and 98 tpd, for 2014 and 2023, respectively. Figures 1 and 2 below illustrate the difference in emission levels with and without the proposed regulation.

Figure 1: Statewide PM emisions inventory in Tons Per Day (TPD)

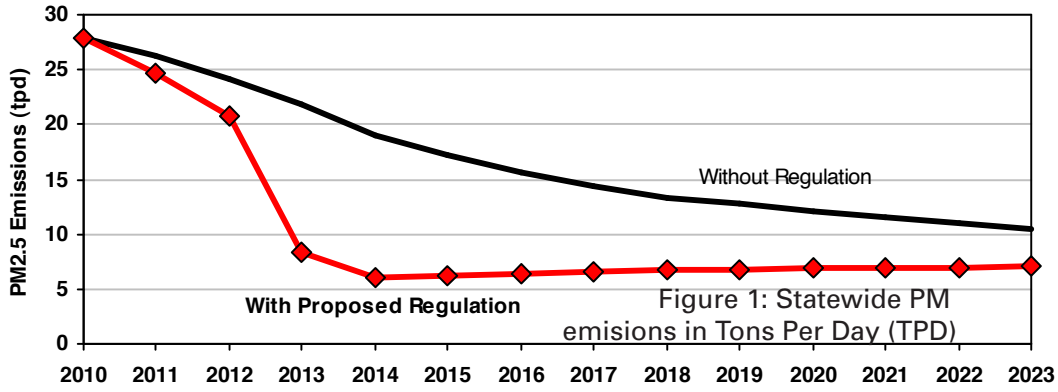
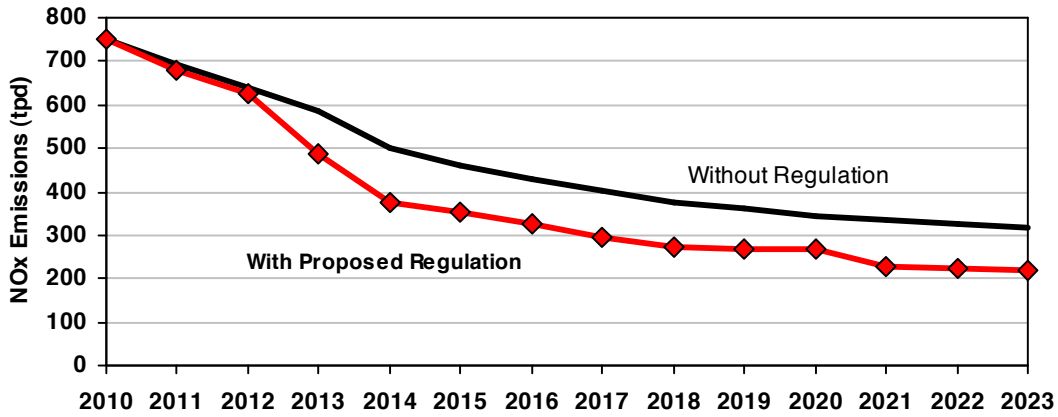


Figure 1: Statewide PM emisions in Tons Per Day (TPD)

Figure 2: Statewide NOx emisions inventory in Tons Per Day (TPD)



What health benefits will the regulation achieve?

These emission reductions will result in lower ambient PM2.5 levels and reduced exposure to diesel PM. Staff estimates that statewide, approximately 9,400 premature deaths statewide would be avoided by the year 2025 from the implementation of the regulation1. Estimates of other health effects avoided statewide include:

- 1,100 hospital admissions due to respiratory causes
- 1,200 hospital admissions to cardiovascular causes
- 150,000 cases of asthma-related and other lower respiratory symptoms
- 12,000 cases of acute bronchitis
- 950,000 work loss days
- 5,500,000 minor restricted activity days

These health benefits will in turn result in economic benefits due to savings from avoided deaths and in health care costs. Staff estimates the economic benefits to be between $48 and $68 billion, depending on the discount rate used.

How can we put the expected health benefits in context?

Over its course, the regulation is expected to prevent about 9,400 deaths, which is roughly twice the number of people killed by car accidents or by secondhand smoke in California each year. Secondhand smoke is estimated to cause about 4,000 premature deaths per year in California (ARB, 2006), while motor vehicle accidents killed 4,236 people in California in 2006 (NCSA, 2007).

How were the health benefits estimated?

Staff utilized three sets of data to determine the estimated health benefits. The first set of data had air-basin specific estimates of emissions of directly emitted diesel PM and NOx, which lead to the formation in the atmosphere of nitrate particles. Staff also had estimates of the ambient particulate matter concentrations in each air basin. Finally, there were epidemiological studies linking ambient levels of particulate matter to various health effects, including premature death. Using these three data sets, staff developed relationships between tons of emission reductions, the corresponding expected decrease in ambient particulate matter levels, and finally, the expected avoided heath impacts.

For additional information

Please contact ARB's diesel hotline at (866) 6DIESEL (634-3735). You may also obtain this document in an alternative format by contacting ARB at: (916) 322-4505 (voice); (916) 324-9531 (TDD, Sacramento area only); or (800) 700-8326 (TDD, outside Sacramento). TTY/TDD/Speech-to-Speech users may dial 711 for the California Relay Service.

NOTES

1 Emissions from vehicles covered by the regulation currently cause 4,500 deaths per year, but this annual impact is dropping over time as the fleet normally turns over to new, cleaner vehicles.

REFERENCES

ARB, 2006b. California Air Resources Board. Environmental Tobacco Smoke: A ToxicAir Contaminant. October 18, 2006. Available at: http://ftp.arb.ca.gov/carbis/regact/ets2006/isor.pdf

NCSA, 2007. National Center for Statistics and Analysis. 2006 Traffic Safety Annual Assessment – A Preview. July 2007. Available at: http://www-nrd.nhtsa.dot.gov/pubs/810791.pdf